



## APEC Chronic Hypertension in Pregnancy Guidelines

Chronic hypertension (CHTN) is present in as many as 5% of pregnant women with the highest rates noted in women 30 years of age and over and in African Americans. CHTN in pregnancy is defined as elevated blood pressure documented either: 1) prior to pregnancy; 2) before the 20<sup>th</sup> week of pregnancy; or 3) continues more than 12 weeks postpartum (Sibai, 2010) (ACOG, Practice Bulletin 125, 2012). Hypertension is defined as a systolic blood pressure of  $\geq 140$  mm Hg or diastolic blood pressure  $\geq 90$  mm Hg or both documented on at least 2 occasions and measured at least 4-6 hours apart (ACOG, Practice Bulletin 125, 2012) (Sibai, 2010). Elevation of either the diastolic or systolic component alone is sufficient to make a diagnosis. CHTN is subdivided into primary (essential) and secondary. 90% of CHTN is primary with the remaining 10% secondary to one or more underlying diseases such as renal disease, collagen vascular disease, endocrine disorders, or coarctation of the aorta (Sibai, 2010).

CHTN in pregnancy can be subcategorized as either mild or severe. Current guidelines define **mild CHTN** as a systolic BP 140-159 mm Hg and/or diastolic BP 90-109 mm Hg documented on at least 2 occasions and measured at least 4-6 hours apart. This definition is analogous to that used for categorization of pre-eclampsia. **Severe CHTN** is defined as systolic BP  $\geq 160$  mm Hg and/or diastolic BP  $\geq 110$  mm Hg documented on at least 2 occasions and measured 4-6 hours apart. Patients with CHTN can be classified as either low-risk or high-risk for adverse outcomes depending on the severity of their disease and prior history. Low-risk pregnant CHTN patients are those with mild essential HTN and no history of perinatal loss or end organ involvement. CHTN pregnant women at high risk include those with secondary HTN, evidence of end organ damage (e.g. renal insufficiency, retinal changes), previous perinatal loss, or baseline BP  $\geq 160/110$  on or off medications.

Management of patients with CHTN diagnosed and treated prior to pregnancy is fairly straightforward, but undiagnosed CHTN in pregnant women who present later for care can be confused with pre-eclampsia or gestational hypertension (GHTN). In the absence of a preconceptional diagnosis of CHTN, measuring blood pressure before 12 weeks is optimal since the normal gestational decrease of blood pressure occurs at 16-18 weeks and may mask undiagnosed CHTN. Pre-eclampsia can be distinguished from CHTN in that it usually appears after 20 weeks gestation in previously normotensive women and is usually, but not always, accompanied by proteinuria; if severe, there will often be signs and symptoms of organ involvement including hemolysis, elevated liver enzymes, elevated serum creatinine, low platelet count, headache, or epigastric pain. Oliguria and elevated Hgb and Hct levels usually indicate hemoconcentration, another factor further indicative of pre-eclampsia. Systemic lupus erythematosus or primary renal disease should be considered if the diagnoses of CHTN or pre-eclampsia do not apply (ACOG, Practice Bulletin 125, 2012). Risks of CHTN in pregnancy include superimposed pre-eclampsia, abruption, premature delivery, intrauterine growth restriction, perinatal mortality, and cesarean delivery (ACOG, Practice Bulletin 125, 2012) (Sibai, 2010).

HTN that presents in the third trimester without signs and symptoms of pre-eclampsia is often diagnosed as gestational hypertension (GHTN). At least 30% of pregnant women with CHTN or GHTN will ultimately develop pre-eclampsia (ACOG, Practice Bulletin 125, 2012) (Sibai, 2010). Signs of superimposed pre-eclampsia may include: 1) the acute onset of proteinuria or a sudden increase over baseline proteinuria; 2) an increase in BP over baseline; 3) onset of symptoms of pre-eclampsia; and 4) development of laboratory abnormalities consistent with organ involvement (ACOG, Practice Bulletin 125, 2012) (Sibai, 2010). HTN that persists beyond 12 weeks postpartum is reclassified as chronic (ACOG, Practice Bulletin 125, 2012).

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All women with a diagnosis of CHTN should have laboratory studies obtained at the time of their initial presentation to establish a baseline status and define the severity of the underlying disease.

### **Baseline CHTN Lab Tests**

- Serum creatinine
- 24 hr urine protein or spot urine for protein/creatinine ratio and creatinine clearance
- Women with long-standing hypertension (>20 yrs), poorly controlled BP or evidence of end organ damage, should also have an EKG and echocardiogram performed to look for evidence of cardiac dysfunction

### **Recommendations**

- Pregnant women with BP 150-160/100-110 mm Hg or higher should be treated with antihypertensive therapy to achieve a target < 150/100 mm Hg and minimize the risk of maternal complications including stroke. (ACOG, Practice Bulletin 125, 2012).
- For women with evidence of end-organ damage, antihypertensive therapy should be initiated to maintain BP in the normal range (140/90 or lower) to reduce the risk of further end-organ damage (ACOG, Practice Bulletin 125, 2012).
- In women with mild HTN who become pregnant, antihypertensive therapy should be withheld unless BP is  $\geq 150/100$  mm Hg or if they have other complicating factors such as cardiovascular or renal disease (ACOG, Practice Bulletin 125, 2012).
- Women with mild HTN who are already taking antihypertensive therapy should continue at their current dose although many need to reduce the dose to maintain an adequate BP and minimize symptoms of hypotension (ACOG, Practice Bulletin 125, 2012).
- Angiotensin-converting enzyme (ACE) inhibitors and angiotensin receptor blockers are teratogenic and are contraindicated during all trimesters of pregnancy.

### **Blood Pressure Measurement Techniques**

- Patient should be asked to remove all clothing that covers the location of the cuff placement, be seated comfortably with legs uncrossed, and the back and arm supported, such that the middle of the cuff on the upper arm is at the level of the right atrium.
- The bladder of the cuff should encircle approximately 75-80% of the arm.
- In morbidly obese patients, the BP can be measured on the forearm listening for sounds over the radial artery. Caution should be used since this method may overestimate the systolic BP (Pickering, 2005).
- Recommended cuff sizes (Pickering, 2005):
  - Arm circumference of 22-26 cm: "Small adult" size: 12x22 cm
  - Arm circumference of 27-34 cm: "Adult" size: 16x30 cm
  - Arm circumference of 35-44 cm: "large adult" size: 16x36 cm
  - Arm circumference of 45-52 cm: "adult thigh" size: 16x42 cm
- **Elevated BP detected by automated machine must be verified by a manual BP device.**

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This document should not be construed as dictating an exclusive course of treatment or procedure to be followed.

### **Fetal Surveillance**

Women with CHTN are at increased risk for uteroplacental insufficiency and therefore at risk for fetal growth disturbance, oligohydramnios, and IUFD. Antenatal surveillance is indicated to identify signs of these problems that would allow intensified surveillance and delivery prior to fetal jeopardy.

- Initial assessment of fetal growth and fluid at 18-22 weeks
- Repeat US for fluid and growth at 28-32 wks and every 3-4 weeks until delivery
- NST, BPP, CST or modified BPP weekly beginning at 32-34 weeks. Women with more severe disease or end organ damage may need twice weekly testing. While the evidence is clear that antenatal testing results in a decrease in perinatal morbidity and mortality, it is unclear that any one form of antenatal testing offers a distinct improvement in outcome versus any other. Therefore, the choice of the method of antenatal testing can be individualized to the practice setting, resource availability, and individual patient as needed.

### **Delivery Plan**

- Uncomplicated mild HTN with normal antenatal testing: plan delivery at term
  - Well-controlled patients (on or off meds) with mild or severe hypertension at baseline with normal fetal growth and antenatal testing should be delivered at 39 weeks and no later than 40 weeks
- Patients with HTN with prior adverse pregnancy outcome (stillbirth) are candidates for earlier delivery after fetal lung maturity is documented
- Patients with severe hypertension refractory to medical treatment but without evidence of pre-eclampsia should be delivered at 37 weeks if antenatal testing and fetal growth normal
- In patients with CHTN who develop superimposed pre-eclampsia, management depends on the gestational age at diagnosis
  - For patients diagnosed prior to 34 weeks, consultation with Maternal-Fetal Medicine specialists is recommended to formulate an evaluation and management strategy that optimizes the risk-benefit ratio for the mother and the fetus. If any severe symptoms or significant laboratory abnormalities are present, delivery at an appropriate level facility is likely indicated.
  - For patients diagnosed at 34-36 weeks, decisions on delivery should be individualized based on the severity of the BP elevations, the presence of laboratory abnormalities and the results of fetal testing. If BP elevations are mild, labs are normal and testing is reassuring, delivery may be able to be delayed until 36-37 weeks.
  - For patients diagnosed after 36 weeks, delivery is indicated at the time of diagnosis.

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### **Quality Indicators/Benchmarks**

- Baseline creatinine
- 24 hr urine protein or spot urine for protein/creatinine ratio and creatinine clearance
- Ultrasound for growth @ 28-32 weeks
- Antenatal testing by 34 weeks

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### Pharmacologic Agents

Oral Antihypertensive Drugs	Dosage	Maternal Adverse Effects
<b><u>Primary Agents</u></b>		
<b>Labetalol</b> (mixed alpha and beta blocker)	200-2,400mg/day in 2-3 divided doses	Headache
<b>Nifedipine</b> (calcium channel blocker)	30-120mg/day slow-release preparation	Headache
<b>Methyldopa</b> (centrally acting sympatholytic)	0.5-3.0 grams/day in 2-3 divided doses	Maternal sedation, elevated LFTs, depression
<b><u>Adjunctive agents</u></b>		
<b>Hydralazine</b> (direct vasodilator)	50-300 mg/day in 2-4 divided doses	Should not be used as a sole agent due to reflex tachycardia; use with a beta-blocker
<b>Hydrochlorothiazide</b> (diuretic and venodilation)	12.5-50 mg/day but minimal benefit above 25 mg	Can cause volume depletion and electrolyte disorders; rarely initiated in pregnancy, but if patient taking prior to pregnancy may continue

### **Acute Severe HTN**

Severe hypertension can be encountered anytime during pregnancy, but most often occurs when patients present with superimposed pre-eclampsia. Prompt attention to control of marked elevations in the BP are required to prevent symptoms of hypertensive urgency and stroke, but care must be taken to not lower the blood pressure too rapidly and cause neither loss of cerebral perfusion in watershed areas or interfere with uteroplacental perfusion. The goal of acute treatment should be to lower the blood pressure to 140-150/90-100 mm Hg.

### **Pharmacologic Agents for Treatment of Severe Acute HTN**

	Dosage	Maternal Adverse Effects
<b>Hydralazine</b>	5 mg IV or IM, then 5-10 mg every 20-40 minutes IV	Maternal hypotension, fetal bradycardia; maternal tachycardia often dose-limiting side effect
<b>Labetalol</b>	20 mg IV, then 20-80 mg every 5-15 minutes, up to a max of 300 mg	Maternal tachycardia and arrhythmia
<b>Nifedipine</b>	10-30 mg PO (NOT sublingual), repeat in 45 minutes if needed	Only used in absence of parenteral options

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### References

ACOG, Practice Bulletin 125. (2012). Chronic hypertension in pregnancy. *The American College of Obstetricians and Gynecologists* .

Pickering, T. G. (2005). Blood Pressure Measurement in Humans. *American Heart Association* , 142-161.

Sibai, B. M. (2010). Chronic Hypertension. In J. C. John T. Queenan, *Protocols for High-Risk Pregnancies 5th edition* (pp. 264-272). West Sussex, UK: Wiley-Blackwell.